Oscilloscope Remote control TEK emulation mode

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Overview

This application note describes the features and usage of the Tektronix compatibility mode for remote control of the SIGLENT SDS5000X and SDS6000A oscilloscope series. In many cases, a SIGLENT SDS5000X/6000A scope can replace a similar Tektronix product without many changes to the existing code. Furthermore, it describes in detail the limitations of the individual emulations and the remaining differences between the emulated and the original commands.

Instrument Compatibility

An emulated instrument having fewer features than, or the same features as the SDS5000X/6000A can be replaced without special care.

However, replacing an emulated instrument having more features than the SDS5000X/6000A or features that differ from those of the SDS5000X/6000A requires additional care.

The user must:

- Ensure that the SDS5000X/SDS6000A complies with the functional requirements of the test
- Verify the application code does not use features in the emulated instrument which are not available with the SIGLENT SDS5000X/SDS6000A.

Currently supported Remote Emulation for the SDS5000X/SDS6000A	
Manufacturer	Instrument
Tektronix	3 Series MDO Oscilloscopes
	MDO3000 series
	MDO4000 series

Command Compatibility

Most of the remote emulations in the SDS5000X/SDS6000A implement the basic commands of the original instrument. Due to functional differences in hardware and software, in certain remote emulations, the SDS5000X/SDS6000A can only be compatible with some parts.

The command table below shows the compatibility information for a command and the difference between

Siglent and Tektronix:

NOTE: Parameters in red are not supported:

Command Compatibility

Command Group	Command	Compatibility Description
Acquisition	ACQuire:MODe	{SAMple|PEAKdetect|HIRes|AVErage|ENVelope}
	ACQuire:STATE	Parameter support:{RUN|STOP}
	ACQuire:STOPAfter	Compatible
Horizontal	HORizontal:RECOrdlength	Value in [,250e3] will set to 250e3 Value in [250e3,1.25e6] will set to 1.25e6 Value in [1.25e6,12.5e6] will set to 12.5e6
	HORizontal:SCAle	Timebase value is in 1-2-5 steps, not like Tektronix instruments from 400 ps to 1000 s
	HORizontal:DELay:MODe	Compatible
	HORizontal:DELay:TIMe	The display value of UI is the opposite of the set value, which actually takes effect
	HORizontal:POSition	Compatible. This setting can be viewed under the menu: *Utility>Reference Pos*
Vertical	SELect:CH<x>	Compatible
	CH<x>:POSition	Compatible
	CH<x>:SCAle	Compatible
	CH<x>:OFFset	Compatible
	CH<x>:PRObe:GAIN	Compatible
	CH<x>:BANdwidth	Parameter supported:{FULl|TWENTY} Not supported:{<NR3>}
	CH<x>:COUPling	Parameter support:{AC|DC} Not supporedt:{DCREJect}
	CH<x>:INVert	Compatible
	CH<x>:TERmination	Parameter supported :{FIFty|MEG} Not supported: {<NR3>}
	CH<x>:LABel	All label characters are automatically capitalized
Trigger	TRIGger:A:TYPe	Parameter supported: {EDGe|LOGIc|PULSe|BUS|VIDeo}
	TRIGger:A:MODe	Compatible
	TRIGger:A:LEVel	Compatible
	TRIGger:A:EDGE:SOUrce	Parameters in red are not supported: {CH1|CH2|CH3|CH4|D0|D1|D2|D3|D4|D5|D6|D7|D8|D9|D10|D11|D12|D13|D14|D15|LINE|AUX|RF}
	TRIGger:A:EDGE:COUPling	Parameter supported: {AC|DC|HFRej|LFRej|NOISErej}. Noise Reject is a single setting item in SDS5000X. When setting the coupling to NOISErej, it will set to DC and turn on the noise reject. When set to others, it will turn off the noise reject.
	TRIGger:A:EDGE:SLOpe	Compatible
Cursor	CURSor:FUNCTION	{SCREEN|WAVEform|OFF}
	CURSor:SOUrce	Parameters in red are not supported: {CH1|CH2|CH3|CH4|REF1|REF2|REF3|REF4|MATH|BUS1|BUS2|BUS3|BUS4|D0|D1|D2|D3|D4|D5|D6|D7|D8|D9|D10|D11|D12|D13|D14|D15|AUTO}
	CURSor:VBArs:POSITION<x>	Compatible
	CURSor:VBArs:HPOS<x>?	Compatible
Measurement	MEASUrement:IMMed:SOUrce<x>	Parameters in red are not supported: {CH1|CH2|CH3|CH4|MATH|D0|D1|D2|D3|D4|D5|D6|D7|D8|D9|D10|D11|D12|D13|D14|D15|HIStogram|RF_AMPlitude|RF_FREQuency|RF_PHASe}
	MEASUrement:IMMed:TYPe	Parameters in red are not supported: {AMPlitude|AREa|BURst|CAREa|CMEan|CRMs|DELay|FALL|FREQuency|HIGH|HITS|LOW|MAXimum|MEAN|MEDian|MINImum|NDUty|NEDGECount|NOVershoot| NPULSECount|NWIdth|PEAKHits|PEDGECount|PDUty|PERIod|PHASe|PK2Pk|POVershoot|PPULSECount|PWIdth|RISe|RMS|SIGMA1|SIGMA2|SIGMA3|STDdev|TOVershoot|WAVEFORMS} When the type is set to DELay, it divides into the following 8 types according to the edges and direction: FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF
	MEASUrement:IMMed:VALue	Compatible
	MEASUrement:IMMed:UNIts	Compatible
	MEASUrement:IMMed:DELay:DIRection	Compatible. It divides into the following 8 types according to the edges and direction: FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF
	MEASUrement:IMMed:DELay:EDGE<x>	Compatible. It divides into the following 8 types according to the edges and direction: FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF
	MEASUrement:MEAS<x>:SOUrce<x>	Compatible
	MEASUrement:MEAS<x>:TYPe	Parameters in red are not supported: {AMPlitude|AREa|BURst|CAREa|CMEan|CRMs|DELay|FALL|FREQuency|HIGH|HITS|LOW|MAXimum|MEAN|MEDian|MINImum|NDUty|NEDGECount| NOVershoot|NPULSECount|NWIdth|PEAKHits|PEDGECount|PDUty|PERIod|PHASe|PK2Pk|POVershoot|PPULSECount|PWIdth|RISe|RMS|SIGMA1|SIGMA2| SIGMA3|STDdev|TOVershoot|WAVEFORMS} When the type is set to DELay, it divides into the following 8 types according to the edges and direction: FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF
	MEASUrement:MEAS<x>:STATE	Compatible
	MEASUrement:MEAS<x>:Value?	Compatible
	MEASUrement:MEAS<x>:MEAN?	Compatible. Valid only when statistics are turned on. Turn on the statistics by using the Siglent command or customize the default settings
	MEASUrement:MEAS<x>:DELay:DIRection	Compatible. It divides into the following 8 types according to the edges and direction: FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF
	MEASUrement:MEAS<x>:DELay:EDGE<x>	Compatible. It divides into the following 8 types according to the edges and direction: FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF
Miscellaneous	AUTOSet	Compatible
	*RST	Compatible. Siglent's preset is quite different from Tektronix's. If need, please customize the preset and save it by the steps: *Save→To Default Key→Current→Save*.
System	LANGuage	Parameter in red is not supported: {ENGLish|FRENch|GERMan|ITALian|SPANish|PORTUguese|JAPAnese|SIMPlifiedchinese|TRADitionalchinese|KOREan}
	TIME	Compatible
	DATE	Compatible
	LOCK	Compatible
	UNLock	Compatible
	FPANEL:PRESS	Parameter supported: { Runstop|SINGleseq}

Activating Remote Emulation

In order to use a specific remote emulation, it must first be activated by the user. Activation is done either

- Manually using the SDS5000X/SDS6000A front panel
- Remotely using SCPI commands

Manual Operation

Follow the steps below:

Utility□Tek Mode, and set the mode to ON

Remote Operation

Send the following command to turn on Tek Compatibility mode:

:SYSTem:REMote:STYLe TEKtronix

Send the command back to Siglent mode:

:SYSTem:REMote:STYLe SIGLent

Example

The following program code realizes the following functions: Setting channel, triggering, and measure delay between waveforms.

Environment: Windows 7 32-bit, Python v3.6.5, pyvisa-1.9

Python Code:

```
import visa

def main():
    _rm = visa.ResourceManager()&lt;/p&gt;
    sds = _rm.open_resource("TCPIP0::10.12.255.21::inst0::INSTR")&lt;/p&gt;
#Set channel parameters
    sds.write("SELect:CH1 ON")
    sds.write("SELect:CH2 ON")
    sds.write("CH1:SCAle 1")
    sds.write("CH2:SCAle 1")
    sds.write("CH1:POSition 0")
```

```
    sds.write("CH2:POSition 0")
#Set the timebase
    sds.write("HORizontal:SCAle 2e-6")
#Trigger the signal stably
    sds.write("TRIGger:A:TYPe EDGE")
    sds.write("TRIGger:A:EDGE:SOUrce CH1")
    sds.write("TRIGger:A:EDGE:COUPling DC")
    sds.write("TRIGger:A:LEVel 0")
#Measure the delay between C1 and C2
    sds.write("MEASUrement:MEAS3:STATE ON")
    sds.write("MEASUrement:MEAS3:SOUrce1 CH1")
    sds.write("MEASUrement:MEAS3:SOUrce2 CH2")
    sds.write("MEASUrement:MEAS3:TYPe DELay")
    sds.write("MEASUrement:MEAS3:DELay:DIRection FORWards")
    sds.write("MEASUrement:MEAS3:DELay:EDGE1 RISing")
    sds.write("MEASUrement:MEAS3:DELay:EDGE2 RISing")
    sds.query("MEASUrement:MEAS3:VALue?")
if __name__ == "__main__":
    main()
```

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